

AMENDMENTS TO THE CLAIMS:

The following listing of claims replaces all prior listings, and all prior versions, of claims in the application.

LISTING OF CLAIMS:

1. (Cancelled).
2. (Currently amended) A fabrication method of a semiconductor integrated circuit device, comprising the steps of:
 - (a) forming a first insulation film over a major surface of a wafer;
 - (b) forming an interconnect groove in an upper surface of said first insulation film;
 - (c) depositing a metal layer containing copper as its principal component over the upper surface of said first ~~insulation~~insulating film and inside said interconnect groove;
 - (d) removing the metal layer outside the interconnect groove by chemical mechanical polishing so as to leave a metal interconnect in the interconnect groove;
 - (e) after step (d), carrying out ~~organic acid~~wet cleaning treatment to the ~~uppermajor~~ surface of said first insulation film and an upper surface of said metal interconnect~~the wafer~~;
 - (f) after step (e), carrying out ~~hydrogen anneal~~first plasma treatment in a ~~first gas atmosphere including an ammonia gas~~ to the ~~uppermajor~~ surface of said first insulation film and the upper surface of said metal interconnect~~the wafer~~;
 - (g) after step ~~(f)~~(e), carrying out ~~second~~ plasma treatment in a ~~second~~ gas atmosphere including an ammonia gas to the ~~uppermajor~~ surface of said first insulation film and the upper surface of said metal interconnect~~the wafer~~; and

(h) depositing an insulation copper diffusion barrier film by plasma chemical vapor deposition on the upper surface of said first insulation film and the upper surface of said metal interconnect treated by said organic acid cleaning treatment, said hydrogen anneal treatment and said plasma treatment~~the first and second plasma treatments.~~

3. – 6. (Cancelled).

7. (Currently amended) A fabrication method of a semiconductor integrated circuit device according to claim 23, further comprising the step of:

(i) carrying out a reducing process after step (d) and before step (e)~~a cleaning process using said acid solution.~~

8. (Previously presented) A fabrication method of a semiconductor integrated circuit device according to claim 7, wherein said reducing process carries out a heating process to the major surface of the wafer in a hydrogen gas atmosphere.

9. (Previously presented) A fabrication method of a semiconductor integrated circuit device according to claim 7, wherein said reducing process carries out a hydrogen gas plasma process to the major surface of the wafer.

10. (Previously presented) A fabrication method of a semiconductor integrated circuit device according to claim 7, wherein said reducing process carries out an ammonia gas plasma process to the major surface of the wafer.

11. – 13. (Cancelled).

14. (Previously presented) A fabrication method of a semiconductor integrated circuit device according to claim 2, wherein said metal layer is deposited by a plating technique.

15. (Previously presented) A fabrication method of a semiconductor integrated circuit device according to claim 2, wherein said first insulation film is an insulation film having a low dielectric constant not larger than 3.

16. (Currently amended) A fabrication method of a semiconductor integrated circuit device according to claim 2, wherein said ~~insulation~~insulating copper diffusion barrier film is formed continuously without releasing to the air after ~~steps (f) and~~step (g).

17. (Currently amended) A fabrication method of a semiconductor integrated circuit device according to claim 2, wherein said ~~insulation~~insulating copper diffusion barrier film is a silicon nitride film or silicon carbide film.

18. (New) A fabrication method of a semiconductor integrated circuit device according to claim 2, wherein citric acid is applied to the upper surface of the first insulation film and the upper surface of said metal interconnect during said organic acid cleaning treatment.

19. (New) A fabrication method of a semiconductor integrated circuit device according to claim 2, wherein a mixture of organic acid and hydrogen fluoride is applied to the upper surface of the first insulation film and the upper surface of said metal interconnect during said organic acid cleaning treatment.

20. (New) A fabrication method of a semiconductor integrated circuit device according to claim 2, wherein in said organic acid cleaning treatment any damaged layer in the upper surface is removed.